

**Comment on *Zoological Record* and registration of new names in zoology**  
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David J. Patterson

*School of Biological Sciences, University of Sydney, N.S.W. 2006, Australia*

David Remsen and Cathy Norton

*Marine Biological Laboratory, Woods Hole, Massachusetts 02543, U.S.A.*

The proposal presented in this article to register all new zoological names is a welcome addition to the initiatives to bring taxonomic practices into the informatics age (see Agosti & Johnston, 2002; Godfray, 2002; Patterson, 2003). Implementation of this strategy would bring the informatics base for animals closer to the situation that prevails for viruses, bacteria, plants, algae and fungi, where similar developments have allowed both taxonomists and others who use names to take better advantage of the informatics world.

‘Compilations of names’ are a key step in the realization of other visions of greatly enhanced access to information about organisms (Patterson, 2003). The value of names compilations has been recognized by a variety of groups (Ruggiero et al., 2002) and agencies, such as GBIF, ITIS, and Species2000. Most compilations currently being assembled serve to catalogue our biodiversity or to provide reference materials for the community of taxonomists. It is more rare to find initiatives that capitalize on the informatics value of taxonomy.

A number of developments are needed to allow biodiversity bioinformatics to make progress. Future strategies must not be conceived as databases but in the context of Internet computing (Stein, 2002). We need openly accessible, non-partisan repositories of names of plants, fungi and microorganisms, as well as of animals. New structures will need to reconcile alternative (whether formal or colloquial) names for the same entities, be respectful of nomenclatural protocols, and accommodate divergent hierarchical classifications. Additional benefits emerge if a distinction is made between names (where the strongest informatics signal lies) and the more subjective elements of taxonomy such as classification schemes (where most of the noise lies) (Pullan et al., 2000). Structures with these features have been available—but they have not been drawn together beyond the conceptual level. We are of the view that the critical step in releasing the potential for biodiversity bioinformatics is the development of name servers that meet the criteria listed above.

Name servers are devices that manage information about biological names and classifications, of which the Taxonomic Name Server (TNS) of the Universal Biological Indexer and Organizer (uBio) project is a good example. The uBio project is based at the Marine Biological Laboratory and Woods Hole Oceanographic Institution Library (MBL/WHOI Library) in Woods Hole, Massachusetts, U.S.A., where it is supported by the Andrew W. Mellon Foundation (<http://www.ubio.org>). The project emerged alongside initiatives to digitize resources within biological literature. As any and all collections of biological information possess an internal index of names, the project sought to call upon names to create pathways to associated data. By including classificatory structures, we can enhance the biological

context of these pathways. The result was a name server using names and classification as devices to access, index and organize biological information.

uBio's Taxonomic Name Server (TNS) embraces but transcends the nomenclatural traditions of microbiology, botany and zoology. It fulfils the normal thesaural expectations of name servers in mapping alternative names for taxa against each other. It separates names from the classification systems with which they are normally associated. Consequently, the name server is neither limited to nor needs to endorse a single classification, but can operate with many co-existing classifications. Without a dependency on classification structures, the system can acquire names that are not placed within any classification but still have informatics potential—such as indexes to holdings in museums or herbaria.

The TNS data model has three broad domains: one for objective nomenclatural information (names, authorities, publications), the second for subjective elements of taxonomy (the ranks assigned to names, synonymies, and hierarchical classifications), and the third relates to management and maintenance of the content and contributions. The last dimension reflects our dependency on the expertise of numerous taxonomists for the content and organizational principles of TNS, and for moulding the structure in which the data resources are placed. In addition to holding data on names and classifications, TNS also documents and credits the origins of data and opinions and provides a return to the taxonomic community by transforming taxonomic knowledge into valuable organizational services.

TNS is currently being populated with the names of all genera and with collective name indexes provided by a large number of individual and institutional collaborators. Because of its potential value to bibliographic enterprises, the uBio project is also committed to the incorporation of older and colloquial names and to this end is co-operating in the conversion of Neave's *Nomenclator Zoologicus* to an electronic format.

From our point of view, the tradition of separating the nomenclature of animals (and other organisms treated as animals) from the nomenclature of plants is no longer desirable. This tradition has sociological and logistical foundations. The defense of these traditions is likely to lead to new informatics tools with the same aims, but which achieve these aims in different ways. Many services that call upon biological information, such as collective indices and authority lists already employed within libraries, information providers, or in molecular databases, are blind to these boundaries. So too are many groups responsible for the monitoring and management of our biodiversity and renewable natural resources who need tools to access information on the appearance, occurrence, and distribution of, and threats to, all types of organisms.

The integration of the concept proposed by Thorne with a name server brings considerable advantages beyond those envisaged for zoology. The first is the capacity for an immediate conversion of catalogues of names into tools capable of drawing together information about organisms to serve the needs of researchers, educators, and decision makers. Second, the placement of zoological names within a universal names compendium allows progress within a global rather than a parochial context. A comprehensive names compilation has nomenclatural advantages, for example eliminating the excuse for all future homonyms, and overcoming many of the problems associated with names of organisms that are only arguable plants or

animals and so fall into the ambiregnal category (Corliss, 1995; Patterson, 1986). Finally, these structures will serve the needs of taxonomists by improving access to information and by providing evidence of the value of taxonomy and of taxonomists.

Estimates that it may take 10 years to compile a list of all names seem to be based on the presumption that the initial steps for aggregating names require expert quality control (Patterson, 2003). This limits the rate of names aggregation. The uBio names acquisition strategy includes three key elements to allow more rapid progress. The first is the separation of objective from subjective elements of taxonomy. Second, we place the quality control step after the compilation of names. This eliminates the rate-limiting step while retaining most of the potential of names as indexing and organizing structures. Finally, our strategy to collect generic names first, coupled with the development of software tools capable of folding in specific names from other names lists, can achieve a unified compilation of all names in current use within the foreseeable future. The only impediment will be the willingness of key bodies to share their names information.

In this regard, we are pleased to note that *Zoological Record* has addressed concerns of access to names in committing continuing access to the Index to Organism Names (<http://www.biosis.org.uk/ion>), and more generally the enthusiasm to share their resources with other names and biodiversity initiatives. We urge the Commission to support this offer, and to promote its extension to all organisms.

#### Additional references

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